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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

REPORT OF FOREST INSECT CONDITIONS IN THE NORTHWEST NATIONAL FORESTS OF THE CALIFORNIA DISTRICT

JUNE - 1936

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by
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Berkeley, California
July 31, 1936

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Forest Insect Laboratory
Berkeley - California
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REPORT OF FOREST INSECT CONDITIONS IN THE NORTHWEST NATIONAL FORESTS OF THE CALIFORNIA DISTRICT

JUNE - 1936

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REPORT OF FOREST INSECT CONDITIONS IN THE NORTHWEST NATIONAL FORESTS OF THE CALIFORNIA DISTRICT JUNE - 1936

Recent infestation trends found in the Regional Survey of 1935 indicated a general decline for that season of barkbeetle losses in the eastside pine type in northeastern California, while a few small areas in the central Sierra region showed a slight tendency toward an increase. However, the trends in any of the northwestern, or coastal, forests of the region had not been determined for a number of years. Little has been known of what was developing in forests not covered by the Regional Survey program aside from the District Ranger's reports which usually deal only with small local areas. The need for an extensive survey to get the general picture in these forests not covered by the regular annual surveys conducted by the Forest Insect Laboratory at Berkeley has been evident for some time.

Such a survey was made possible in June of the current season through a cooperative arrangement whereby the necessary funds for field expenses were supplied by the Forest Service; and the Bureau of Entomology and Plant Quarantine undertook the field work. J. B. Patterson of the Bureau was detailed on the assignment and got into the field on May 29. The purpose of this reconnaissance was primarily to supplement the regional surveys made in other parts of the region and to secure information on any new situations which had recently developed or were appearing.

The National Forests included in the assignment were the Klamath, Trinity, and Mendocino. These were examined in the order named. In addition, a local infestation on the west side of Goosenest Mountain in the Willow Creek section of the Shasta was examined by Senior Entomologist J.M. Miller and Dr. K. A. Salman.

In general the current Dendroctonus infestations on these forests was found to be considerably below that of previous years. The high point seems to have been reached in 1931-1934; subsequent infestations have shown a progressive and decided decline. This trend is general and with the exception of certain local areas; Hilt, Yreka, and Callahan on the Klamath, Goosenest on the Shasta, and Paskenta and Alder Creek on the Mendocino, where local conditions have maintained noticeable losses which are apparently aggravated by the weakening of trees due to flathead attack.

FLATHEAD INFESTATIONS IN MARGINAL SITES

A comparatively new type infestation in pine has recently appeared in the marginal stands on the Klamath, Shasta, and Mendocino, resulting in heavy losses in several well defined areas. These infestations consist of a close association of flatheads (Melanophila), the western pine beetle, and Ips spp. The primary cause of the outbreaks, which are highly epidemic, is not definitely known but are unquestionably correlated with climatic conditions and site, since they occur only in the marginal stands, or in isolated islands of timber on dry flats. Perhaps a combination of factors

resulting in arrested and suppressed tree growth are responsible. The unusual association of the three primary insects concerned in these infestations advances the question of which one is most responsible. Examination of many trees in the epidemic centers revealed that the flatheads were first on the ground and probably made the first attacks on the greater portion of the killed trees. This assumption is further strengthened by the presence of flathead larvae working under the bark of green trees which showed no other indication of attack. Whether these trees will die from the flathead attacks alone remains for future examinations to disclose. A few dead trees showing only flathead work were found in all of the areas examined. However, the majority of dead trees showed in addition the work of the western pine beetle and Ips separately, or together, the Ips usually preferring the tops. It is yet an open question whether the flathead infestations will result in epidemic losses without the assistance of either or both the barkbeetles.

These infestations while highly conspicuous had not been reported by forest officers prior to 1936, although their inception undoubtedly occurred three or four years previous. The two most prominent areas near Hilt and Yreka were first noticed by the writer in May 1936. Similar epidemic centers were found at that time on the northern side of the Siskiyou Mountains in Oregon, indicated widespread occurrence of this type of infestation. The epidemic losses occur mainly within a band from one to two miles in width in the marginal stands between the brush areas, or open country, and the better site stands further back in the forest; or as in the case of the Yreka epidemic, in isolated stands of young growth on flats. (See photograph "A" in Plate I, p. 8)

Other areas were found east of Callahan and along the Goosenest addition of the Shasta. The Goosenest zone is about one mile wide and probably extends northward as far as the Klamath River Canyon. Another area located farther south in the Mendocino extends along the east slopes from Paskenta to Alder Springs. This area is a well defined band of dead timber between the brush areas below it and the better stands higher up. (See photographs in Plate IV, p. 11). The remnant of living forest in this decimated zone is now free of any noticeable infestation indicating that the epidemic has run its course and has disappeared. Little of the timber that has been killed, however, is in commercially valuable stands.

Forest entomologists have known for several years that the flathead beetles play an important role in the top-killing of pine. However, recent investigations, particularly in the eastside forests, have indicated a far more serious result of their activities when in massed attacks on the main stem of trees. These attacks may weaken infested trees to such an extent that it is possible for the other tree-killing forms to develop and maintain an epidemic infestation. These conditions may be the key to continued infestations in many marginal pine stands that have persisted for the past decade regardless of more favorable precipitation and growth conditions. The peculiarities of these infestations; their aggressiveness and consequent epidemic losses, warrant further and continued observations. Periodic surveys of all the known areas, together with areas now suspected of early invasion seems desirable.

KLAMATH FOREST

The pine stands of this forest were examined during the period May 29 to June 9, 1936. The local forest officers at Yreka assisted greatly in supplying information of a general nature and in providing maps. All the susceptible pine stands of the forest were included in the survey which extended down the Klamath River to a point 10 miles west of Seiad where the coast type association of pine and fir begin. Reference to maps, (pages 12&13), show the areas examined and the location of the current infestations found.

Areas "A" and "B": Hilt and Yreka: Epidemic infestations of the combined flathead-western pine beetle-Ips character have persisted in these marginal stands for at least the past four years. Large group attacks are characteristic of these infestations so that the toll taken by the beetles has been heavy; at least 50% of the trees are already dead in the epidemic centers and the infestation shows no signs of abatement. Examination of the dead trees showed the characteristic work of Melanophila, Dendroctonus, and Ips. The greater portion showed evidence of having been killed by the western pine beetle. Ips spp. had been active in many, evidently preferring the tops and upper bole. Larval scars on the sapwood showed that flatheads had preceded the attacks of the barkbeetles and were doubtless of primary importance in the beginning of these infestations. The possibility that these beetles are also largely responsible for the continuance of the infestations is indicated by the high percentage of green trees showing active flathead infestation in the phloem.

The infestation on the two areas is strikingly similar in both character and abundance. The 1935 loss will average well over 200 dead trees per section. It is, however, confined to the marginal type where local conditions are apparently necessary for its continuance. It does not occur in the better stands. The photograph "A" in PlateI is a characteristic example of recent loss in a part of the Yreka area. The light colored trees were attacked in 1935 and faded in the spring of 1936. They represent the latest spread of the infestation in a part of the area not previously attacked. The photographs "B" and "C" show the pattern of flathead mines as they appear in green trees. The first year mines of the flathead ordinarily heal over but are still traceable on the sapwood. The second year mines may also heal unless the tree dies from these attacks or is attacked by Dendroctonus or Ips. The abundance of these attacks in green trees in and adjacent to barkbeetle infestations indicates the aggressiveness of the flathead infestation. It is believed that the Dendroctonus and Ips infestations, with consequent losses, will follow in epidemic form as long as the flathead infestations continue.

Area "C": Craggy Mountain: A disturbing amount of dying and dead timber is evident on parts of this area. Examination of the dead trees shows that the western pine beetle has been the most active agent in these infestations and the greater parts of the losses have been due to this beetle. There is evidence that the losses reached a peak in 1934 and have been declining since

that year. These previous infestations, as well as the current losses, have been confined to an area of about 10 sections on the south slopes north of the two Humbug creeks. This is historic ground in early forest entomology and the location in 1912 of one of the first beetle control projects carried out in the West. It is interesting to compare the infestation at that time with that of today. The number of trees killed in 1911 immediately preceding the control operations was 1022. The latest complete infestation, the 1935 loss, amounted to 694 trees. During the intervening 24 years the beetle losses have annually fluctuated as shown by recorded data. The record is not complete but accurate survey figures are available for the first 5 years, and the accumulation of snags and down timber offers a clue to the subsequent infestations and losses. The recorded losses were 384 trees in 1914; 838 in 1915; 478 in 1916; and 728 in 1917. The amount of dead timber in all stages of decomposition shows that the area has not been entirely free of infestations during any portion of this 24 year period. As a result the stands are largely depleted of mature pines and large deadenings have appeared on the more exposed sites. Recession of the forest along the lower margins has resulted from insect activities and fires so that the present timbered area is much less than formerly. The relatively small amount of current losses indicates the beginning of another low cycle in the infestation.

Area "D": McKinney Creek: The history of beetle infestations on this area parallels that of Area "C". Sustained high annual losses had occurred for years prior to 1920. Another epidemic cycle appears to have taken place from 1931 to 1934. The latest complete loss amounted to 300 trees on the 10 infested sections of the area. The current infestation is estimated to be considerably less.

Area "E": Klamath River: Includes the lower drainage basins of Beaver, Doggett, and Horse Creeks, and also a mixed stand south of the river near Hamburg. The recent losses, and also the current infestations, are negligible and do not warrant further discussion.

Due to a general recession of the forest on the exposed, susceptible, sites, infestations are not likely to appear again for many years. The recession of type in these marginal forests is due to insect activity and fires. A comparative example is the Doggett Ridge shown in the photograph in Plate II, page 9 .

Area "F": Scott River: The pine stands on this area are scattered and widely separated by areas of fir and oak. Rather heavy beetle losses have occurred in past years, previous to 1930, as evidenced by many old snags and fallen timber. These infestations have largely disappeared and current losses are at the minimum.

Area "G": Scott Valley: Sporadic beetle losses have occurred for years throughout the foothill stands of the area. The present infestation, however, has greatly declined from the high point reached in 1933. Indications are that a further decline is imminent. A small local stand on and near China Mountain east of Callahan and well isolated from other timber is being

greatly depleted by an association of flathead-western pine beetle-engraver beetles. This infestation shows the same characteristics as those at Yreka and Hilt and for this reason is expected to continue. Between 40 and 50% of the stand is already dead and it seems only a question of time until it is completely wiped out. Photograph of a part of this area appears in Plate III, page 10 .

There is a flagrant infestation of the pitch midge, (Retinidiplosus) in second growth pine on both sides of the valley near Etna and at Callahan. This insect attacks the terminals of the branches causing pitching up of the stems and later death, resulting in stunted tree growth and even death of the trees in sustained infestations. There is no known remedy. However, epidemic infestations usually persist only for short periods of 3 to 4 years when the damage clears up. This insect is responsible for the configuration of pine known as "birds-eye" grain.

SHASTA FOREST

The Goosenest addition of this forest was examined by J. M. Miller on June 9; and since conditions found thereon are very similar to several other areas on the Klamath it seems advisable to report them in this connection.

Mr. Miller states that a zone of heavy killing about a mile or two in width occurs along the western boundary of the forest. Observations were made only from the road between Little Shasta and Bull Meadows. In the vicinity of Dry Creek fully 50% of the stand had been killed within the past three years; including both ponderosa pine and Douglas fir. The zone affected extends from the marginal type at the forest boundary for about two miles east, or until the better growing sites are reached. The extent of this belt to the north and south of the Little Shasta road was not determined. Distant observations indicated a spread to the north as far as Eagle Rock, a distance of 9 miles. Examination of the dead trees showed that a high percent of the pine had been killed by the western pine beetle, but the recent infestation of this insect had declined to a very marked degree from that of 1934 when it was probably at a peak. Green trees showed a good deal of active flathead infestation in the phloem indicating a similar condition of infestation as those at Hilt and Yreka.

Ponderosa pine above this zone killing was free of any noticeable infestation. The dead Douglas fir had undoubtedly been killed by the flathead, Melanophila drummondi. White fir and red fir on the northern slope of Goosenest Mountain contained a red belt of dying trees probably resulting from Scolytus attack. The location of these infestations is shown on the map, page 14 .

TRINITY FOREST

The principal pine forested areas of this forest were examined on June 9, 10, and 11. The areas examined are shown at "A" and "B" on the maps, pages 15 and 16 . The local forest officers at Weaverville were of considerable assistance in securing information from ranger districts and suggesting routes of travel.

Area "A": Trinity Alps: Includes the timbered watersheds on the Stuart Forks of the Trinity River and the country surrounding Weaverville. This entire area is remarkably free of insect infestations and without indication of having suffered insect losses for at least the past ten years. There are some very fine virgin stands of both ponderosa pine and sugar pine on the Stuart Forks. Conditions are favorable for vigorous growth and since very little cutting, or other disturbances of natural conditions, has taken place the forest is in primeval condition.

Area "B": Hayfork: The foothill region surrounding Hayfork Valley is timbered with the marginal type of ponderosa pine, normally highly susceptible to insect attack. However, this area has escaped the devastation which occurred in typical stands in the early 1930's on the Klamath and Mendocino. A few dead trees killed by insects in 1934 and 1935 were seen in the lower margins of these stands. Their number was not great, scarcely exceeding 20 trees per section for the two years loss. Examination of these trees showed that they had been killed by the western pine beetle. The washed area in "B" on the map, page 16, shows the location of the heaviest concentration in this area.

MENDOCINO FOREST

Sections of this forest were examined June 12, 13, and 14. The regions examined are shown in the areas "A" and "B" on the maps, pages 17, and 18. Assistant Supervisor Derby at Willows was of very real assistance in an informative way and is keenly alive to insect activities on the forest. His suggestions and advice relative to the location of recent infestations expedited the survey of the forest by eliminating non-infested areas.

Area "A": Paskenta: Active infestations in this section have greatly declined from the high point which appears to have been reached in 1933. However, the epidemic infestations of 1931-1933 resulted in heavy losses in the marginal stands just above the brush areas. Between 50 and 60% of the pine timber in this fringe type was killed, leaving only a sparse stand of the younger and thriftier trees. This loss is visible on both sides of the Covelo road for a distance of four miles and extends from the brush areas to the higher elevations where the better stands begin. It is a well defined band of black snags along the eastern face of the forest extending from Round Mountain south to the divide North of Grindstone Creek. Current infestations in this zone are negligible since practically all the susceptible trees have already been killed. Examinations of the dead trees showed that they were killed by the western pine beetle although there was an active infestation of flatheads at that time as is evidenced by larval scars on many of the dead trees. There is a rather heavy sprinkling of dead Douglas fir in these stands which was killed by the fir flathead, Melanophila drummondi. This infestation, like that in the pine, has largely disappeared.

Areas "B": Alder Springs: Evident recent losses shown by the great amount of dead trees and snags indicates a heavier concentration of infestation on this area than has taken place elsewhere on the forest. These losses, which occurred from 1930 to 1934, were largely confined to the marginal stands between the brush areas and the better growing stands higher up. The contrast between the devastated marginal stands and those above this zone is striking

in casual observation and is shown to even greater extent by the photographs in Plate IV, page 11. Very few living trees remain in this deadened zone which is from 1 to 2 miles wide. A change in forest cover is rapidly taking place and the immediate result is a recession of the pine forest to the full width of the dead strip. Very few infested trees were found in this zone since the recent epidemic practically wiped out the stand. The few remaining green trees, as well as the tead trees, show an abundance of flathead work; and although the dead trees were evidently killed by the western pine beetle the flatheads were a factor of prime importance in these infestations.

Since the marginal stands are already largely depleted a continuance of the infestation is highly improbable. The current losses are negligible.

There has been a rather heavy killing of Douglas fir by the flathead, Melanophila drummondi, in the upper edge of the marginal zone. This infestation, like that in the pine, has greatly declined. The fir stands, however, have not been badly damaged.

Area "C": Upper Lake: In direct contrast to conditions in the more northern areas the general mixed stands in this area have not been greatly damaged in recent insect outbreaks. There has been some killing of pine by the western pine beetle on the more exposed sites between Bartlett Springs and Pinnacle Rock, and also in the marginal stands between Windy Point and Youngs Peak. The current infestation is low and shows a decline from previous years. A general view of the Pillsbury Lake region was obtained from Horse Mountain, but as conditions appeared to be normal this area was not examined further. Conditions on the old blowdown which occurred in the 20's have cleared up and recent infestations have been of little consequence.

A few sugar pine trees infested with the mountain pine beetle were noted and examined in a recently logged area at the head of Middle Creek. These few attacks developed from slash in the near vicinity and are not expected to cause notable loss.

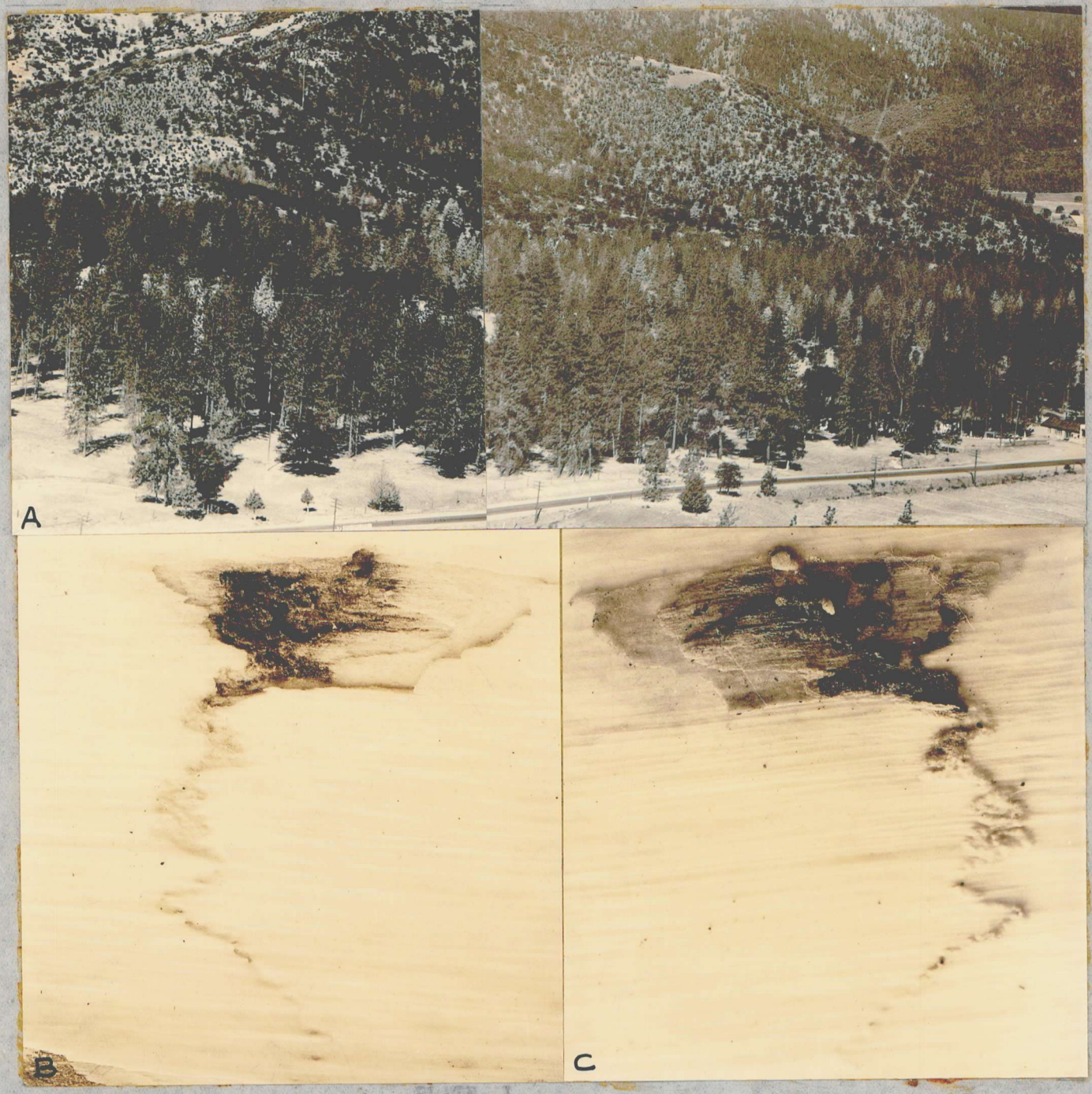


PLATE I

Recent epidemic infestation in marginal pine stands on Yreka Creek. "A" - Beetle killed trees (shown in lighter tone) were attacked in late 1935 and faded in spring of 1936. These trees represent a recent spread of the infestation on a part of the area not previously infested. The great number in evidence indicates the severity of the flathead-western pine beetle-Ips infestation. Most of the surrounding green trees had already been attacked by flatheads although showing no external evidence of this condition. It is believed that high losses will follow in epidemic form as long as the flathead infestation continued. "B" - Surface of inner bark showing healed over scar of flathead mine begun previous year and recent extension made second year which is not healing. "C" - Surface of sapwood showing healed over first end of flathead mine and recent extension with larva in this unhealed portion. This initial flathead work precedes the later attacks made by the barkbeetles.

PLATE II

Recession of type due to beetles and fires. Doggett Ridge, Klamath Forest. Such areas are common throughout the Klamath River District of this forest. This area supported an active beetle infestation for a period of years previous to the fire which occurred in 1924. The area was cruised for beetle losses in 1914 by J. E. Patterson and W. E. Glendinning of the Bureau. Subsequent annual cruises were made by the Bureau up to 1918. The yearly losses on the 12 section unit for this period were: 1914 - 326 trees; 1915 - 1292 trees; 1916 - 258 trees; 1917 - 164 trees. Following the fire conditions have been unfavorable for the beetles and corresponding losses have been low and widely scattered.

PLATE III

Results of a flathead-western pine beetle-Ips infestation in the marginal pine stands on China Mountain near Callahan, Klamath Forest. Approximately 50% of the ponderosa pine on this mountain and vicinity has already been killed. The recently faded trees show that the infestation is still active. Many situations like the above have developed in the marginal stands on the western Shasta, Klamath, and Mendocino Forests during the past ten years.

PLATE IV

Examples of forest types in zone of infestation and in areas above this zone. Alder Springs district, Mendocino Forest. The upper picture shows a normal stand of pine timber above the fringe type. These better stands are not highly susceptible to beetle attack. Lower picture is an example of the susceptible marginal, or fringe type, where beetle losses have been high. On this area the marginal forest has been practically wiped out in a succession of infestations occurring over a period of 5 years. It is characteristic of conditions found throughout the marginal stands of this forest and on the Klamath. The Goosenest infestation on the Shasta is another prominent example. These beetle killings result in a recession of forest for a distance of from 1 to 2 miles. The brush is already replacing the former timber stands.

KLAMATH NATIONAL FOREST

AREAS EXAMINED

A - HILT

B - YREKA

C - CRAGGY MOUNTAIN

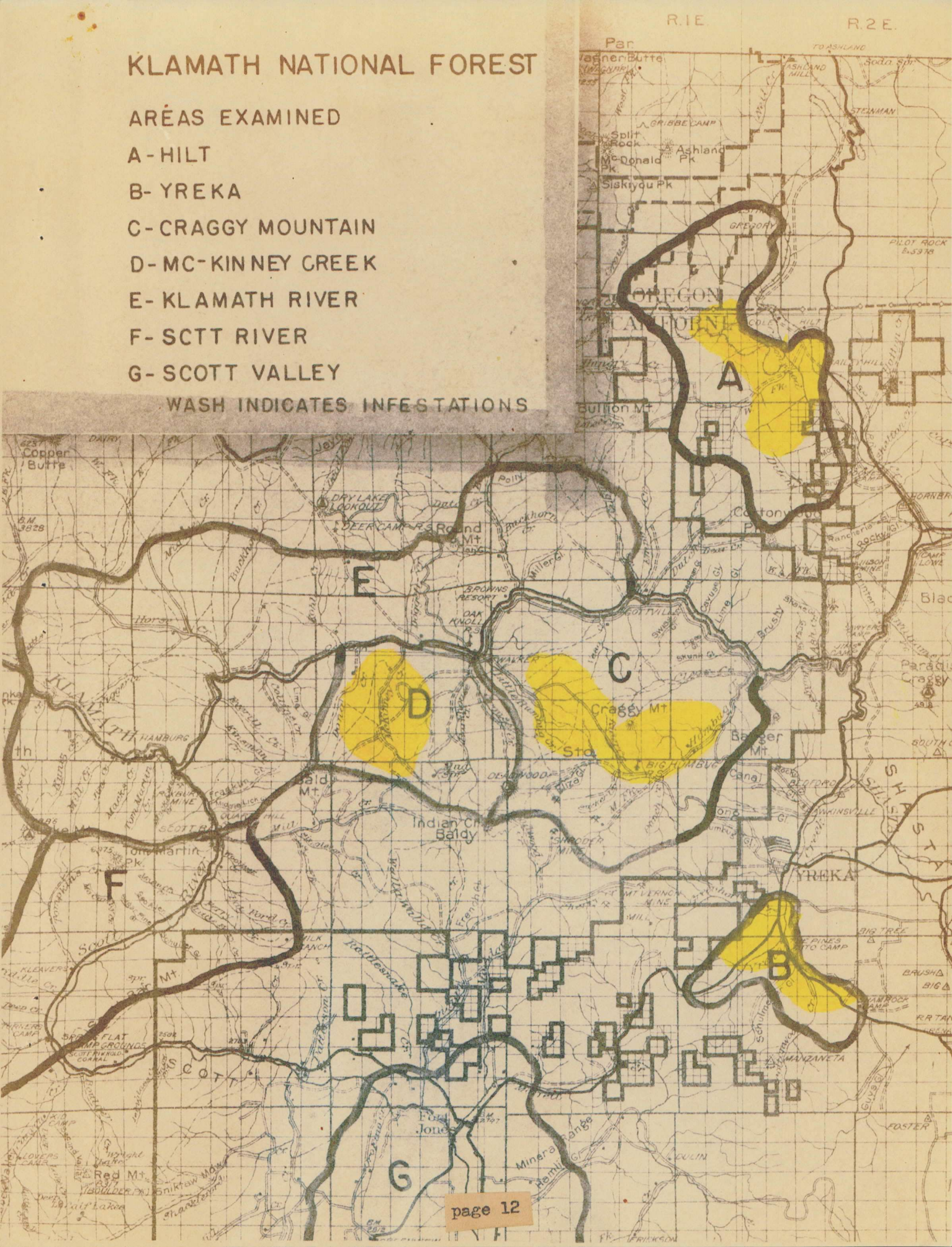
D - MC-KINNEY CREEK

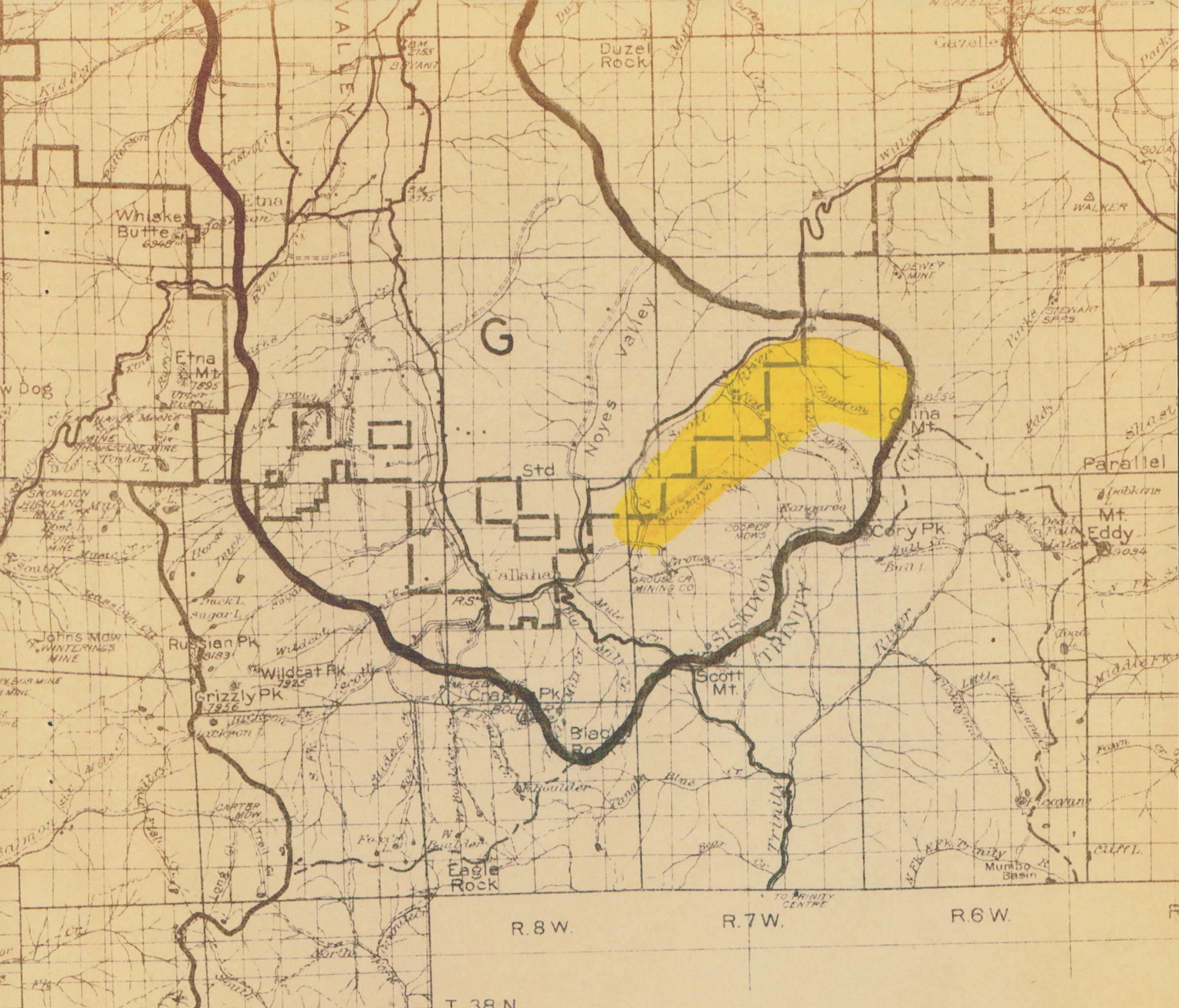
E - KLAMATH RIVER

F - SCTT RIVER

G - SCOTT VALLEY

WASH INDICATES INFESTATIONS





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KLAMATH NATIO
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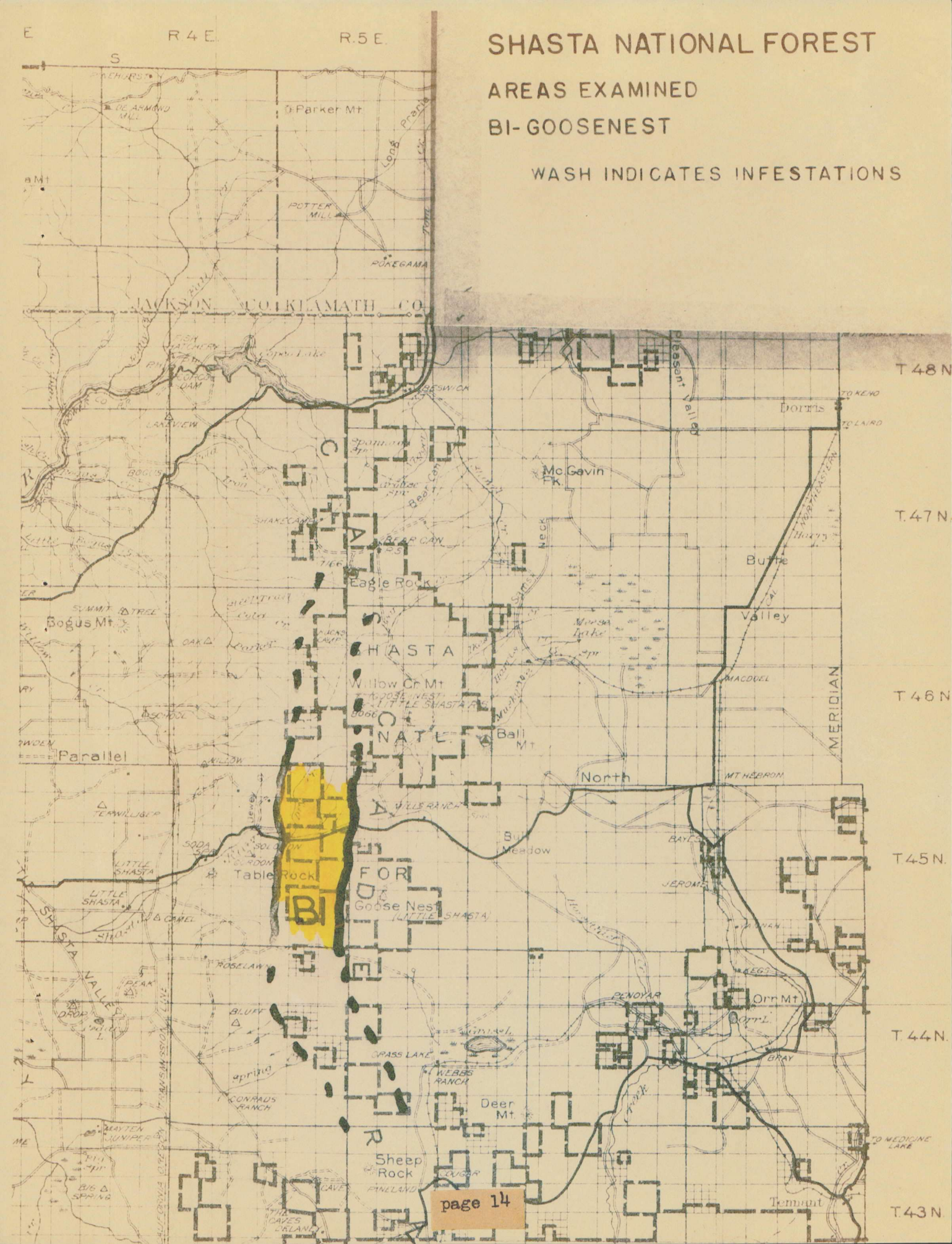
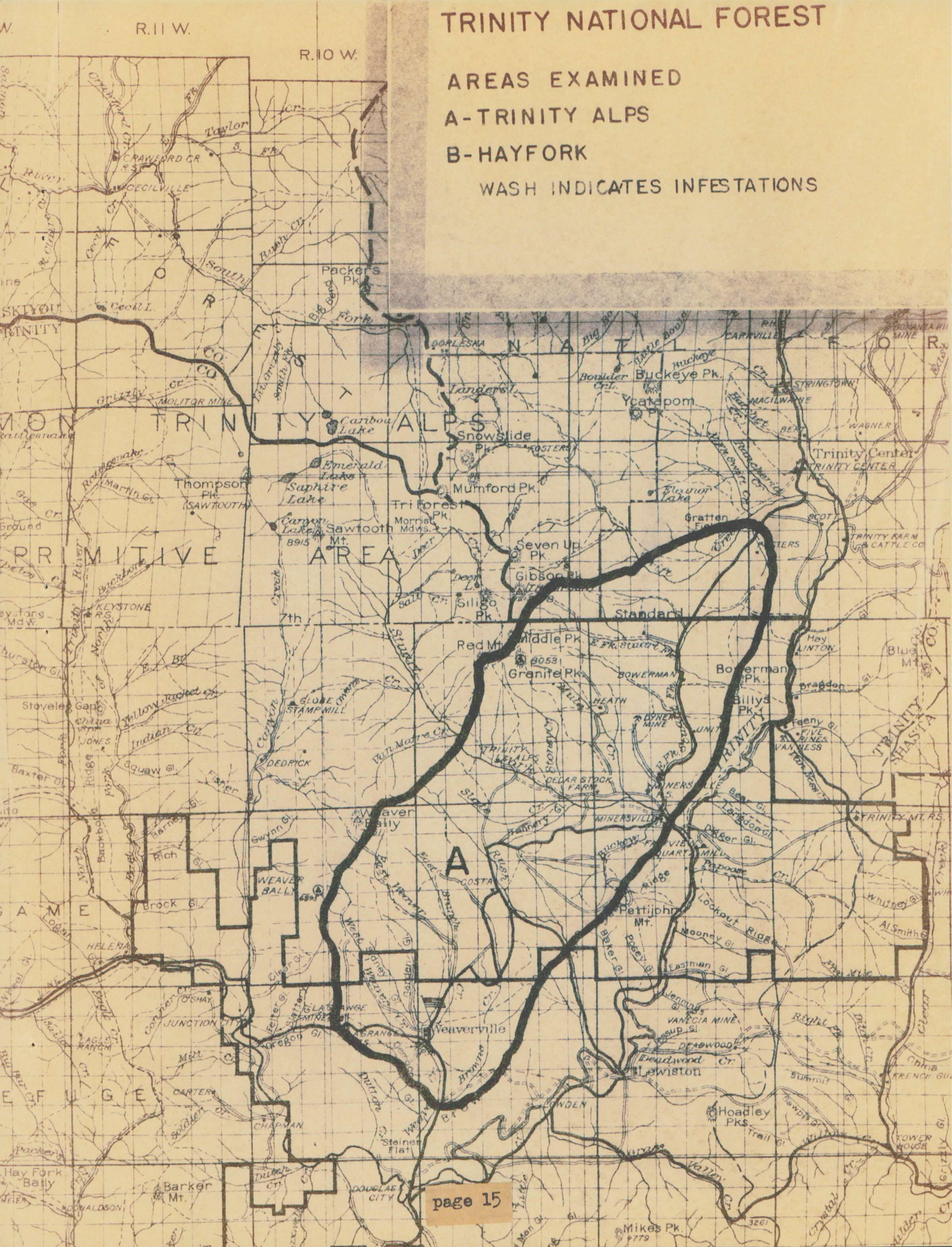
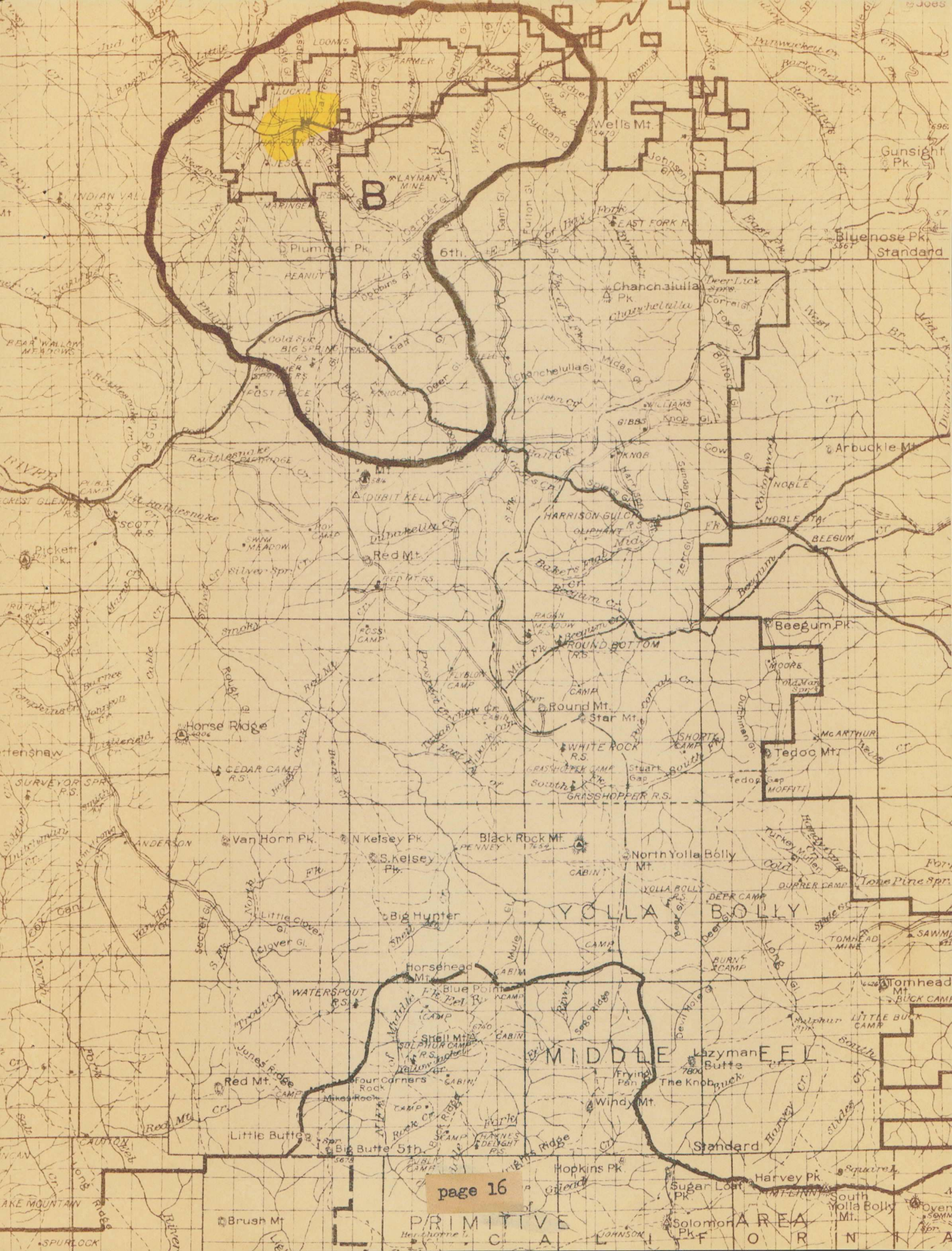
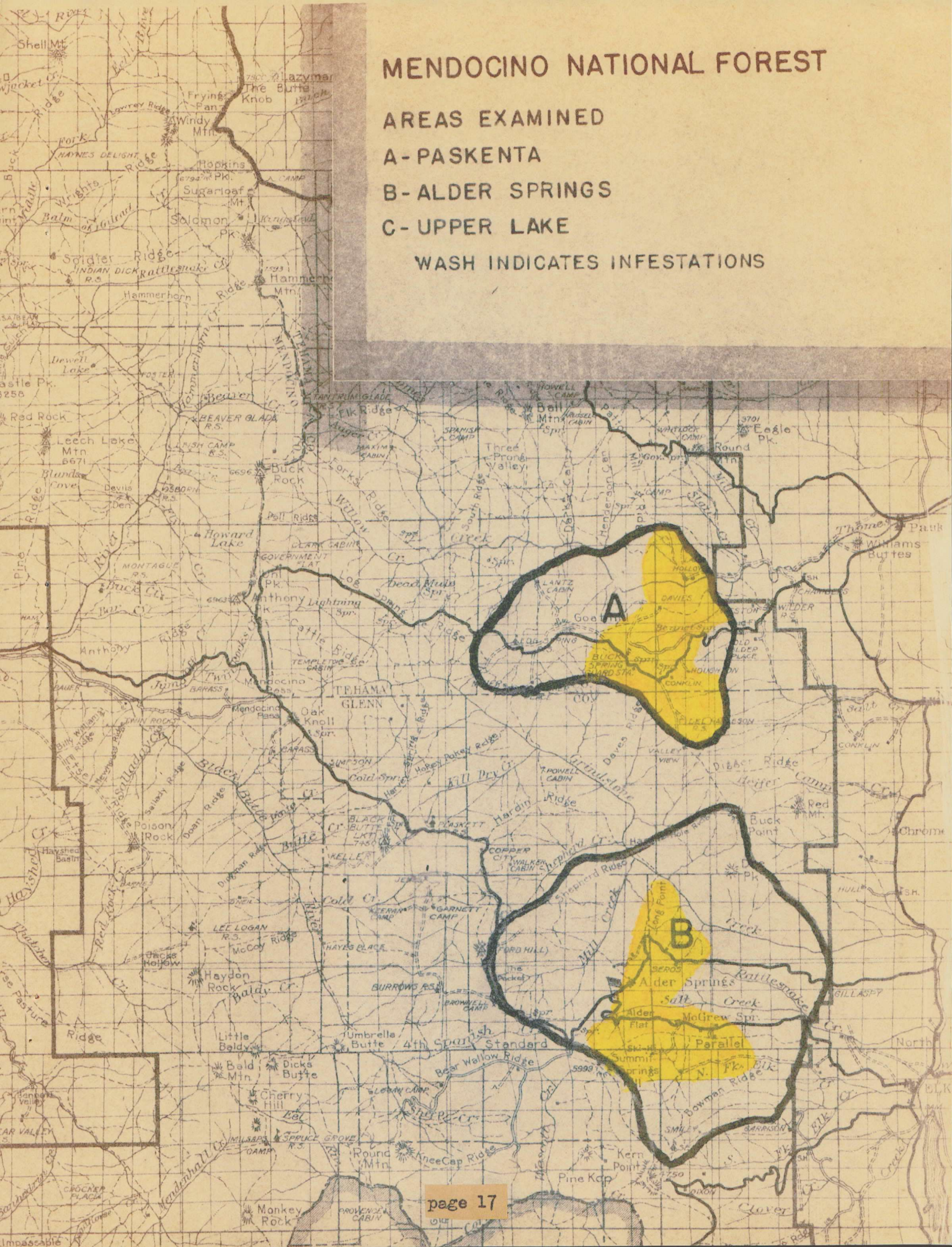
1934

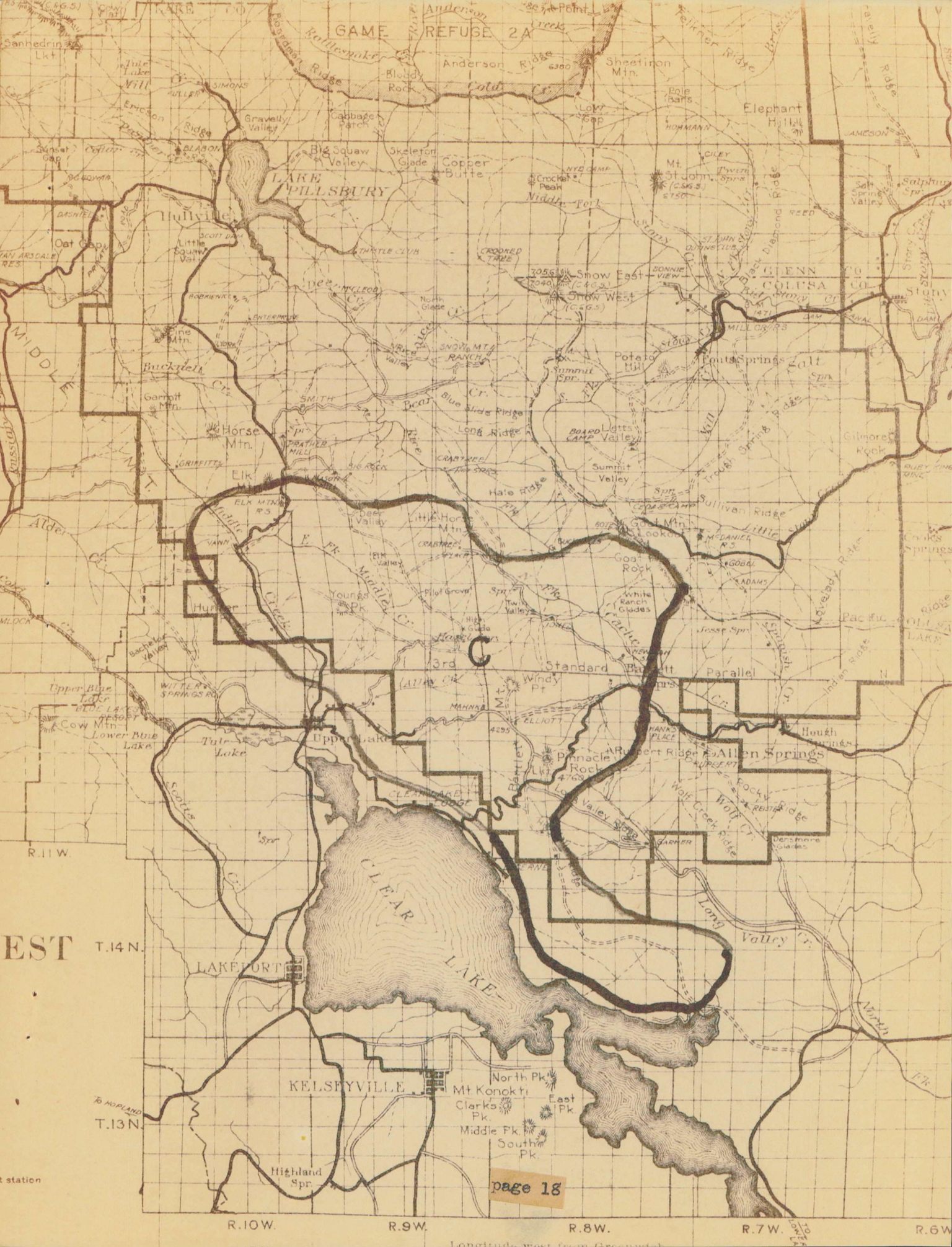
Scale


SHASTA NATIONAL FOREST
AREAS EXAMINED
BI-GOOSENEST
WASH INDICATES INFESTATIONS
R 4 E.
R 5 E.
T 48 N
T 47 N.
T 46 N
T 45 N.
T 44 N.
T 43 N.
Parker Mt.
JACKSON CO.
KLAMATH CO.
Mc Gavin Pk.
Eagle Rock
Bogus Mt.
Willow Cr Mt
Ball Mt.
Parallel
North
Table Rock
Goose Nest
Deer Mt.
Sheep Rock
Orr Mt.
Tennant
MERIDIAN
page 14


TRINITY NATIONAL FOREST
AREAS EXAMINED
A-TRINITY ALPS
B-HAYFORK
WASH INDICATES INFESTATIONS
R.11 W.
R.10 W.
TRINITY ALPS
PRIMITIVE AREA
Packers Pk.
Boulder Buckeye Pk.
Ycatapom Pk.
Caribou Lake
Snowslide Pk.
Emerald Lake
Saphire Lake
Thompson Pk. (SAWTOOTH)
Carver Lake
Sawtooth Mt. 8915
Tri Forest Pk.
Morris Mdws.
Mumford Pk.
Seven Up Pk.
Gibson Pk.
Siligo Pk.
Standard
Red Mt.
Middle Pk.
Granite Pk. 8053
Bowerman Pk.
Billys Pk.
Trinity Center
Gratten
Weaver Bally
Pettijohn Mt.
Weaverville
Lewiston
Hoadley PKS.
Barker Mt.
Mikes Pk. 7779
page 15


B
Wells Mt.
Gunsight Pk.
Bluenose Pk.
Standard
Plummer Pk.
6th.
Chanchalulla Pk.
Arbuckle Mt.
Red Mt.
Beegum Pk.
Round Mt.
Star Mt.
Horse Ridge
Tedoc Mt.
Van Horn Pk.
N Kelsey Pk.
S. Kelsey Pk.
Black Rock Mt.
North Yolla Bolly Mt.
YOLLA BOLLY
Big Hunter
Horsehead Mt.
Tomhead Mt.
MIDDLE EEL
Lazyman Butte
Red Mt.
Windy Mt.
Little Buttes
Big Butte
5th.
Standard
Hopkins Pk.
Harvey Pk.
Sugar Loaf Pk.
South Yolla Bolly Mt.
Brush Mt.
Solomon Pk.
PRIMITIVE AREA
page 16


MENDOCINO NATIONAL FOREST
AREAS EXAMINED
A - PASKENTA
B - ALDER SPRINGS
C - UPPER LAKE
WASH INDICATES INFESTATIONS
A
B
Shell Mt.
Windy Mtn.
Sugarloaf Mt.
Hammerhorn
Leech Lake Mtn
Red Rock
Howard Lake
Anthony Peak
Mendocino Pass
TEHAMA
GLENN
Oak Knoll
Poison Rock
Haydon Rock
Baldy Cr.
Little Baldy
Bald Mtn.
Dicks Butte
Cherry Hill
Spruce Grove
Round Mtn.
Monkey Rock
Bell Mtn.
Eagle Pk.
Round Mtn.
Three Prong Valley
Buck Rock
Red Mt.
Buck Point
Alder Springs
Alder Flat
McGrew Spr.
Parallel
Summit Springs
Pine Knob
Kern Point
Williams Butte
Paskenta
Goat Mtn.
Davies
Bucks Spring
Conklin
Valley View
Heifer Camp
Kill Pry Ck.
Hardin Ridge
Copper City
Shepherd Ridge
Long Point
Hull Creek
Salt Creek
Rattlesnake Creek
Gillaspy
Bowman Ridge
Elk Creek
Bear Wallow Ridge
Umbrella Butte
4th Spanish Standard
Knee Cap Ridge
Pine Knob
Dixon
Glover
Hayshed Basin
Red Rock Ridge
Black Butte
Sawmill Ridge
Deer Ridge
Deadman Ridge
Mendocino Ridge
Elk Ridge
Beaver Creek
Wilson Creek
Thorne
Howell Camp
Spanish Camp
Hayes Place
Burrows Ranch
Garnett Camp
Lee Logan Ranch
Logan Camp
Provence Cabin
Walker Cabin
Ford Hill
Jackass Hollow
Crocker Place
Impassable


GAME REFUGE 2A
Anderson Ridge
Bloody Rock
Sheetiron Mtn.
Elephant Hill
Big Squaw Valley
Skeleton Glade
Copper Butte
LAKE PILLSBURY
Hullville
Mt. St. John
Crooked Peak
Middle Fork
Snow East
Snow West
GLENN CO.
COLUSA CO.
Potato Hill
Fouts Springs
Horse Mtn.
Elk
Deer Valley
Little Horse Mtn.
Hale Ridge
Sullivan Ridge
Goat Rock
White Ranch Glades
Summit Valley
Lights Valley
Gilmore Rock
Pacific
Standard
Parallel
3rd
Windy Pt
Upper Blue Lake
Lower Blue Lake
Cow Mtn.
Tule Lake
Upper Lake
Pinnacle Rock
Allen Springs
Hough Springs
Rocky Ridge
Wolf Creek Ridge
Long Valley
CLEAR LAKE
LAKEPORT
KELSEYVILLE
Mt Konokti
North Pk.
East Pk.
Clarks Pk.
Middle Pk.
South Pk.
Highland Spr.
TO HOPLAND
T.14N.
T.13N.
R.11W.
R.10W.
R.9W.
R.8W.
R.7W.
R.6W.
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